



MIGRATION AND BANDING

8

CROW

Snow, ice, empty skies,
Then here they are again,
Emperors of thick-boughed trees.
Tearing raucous cries
From the underbelly of the spring sky.

– David Scott 2012

To try and understand how birds orientate themselves during migration, an array of environmental guides have been proposed – stars, polarized sky light, the moon, wind direction, vegetative sounds, landmarks, and the earth's magnetic field. Considering the last possibility, iron oxide was located “around the olfactory nerve and bulbs and between the eyes, and also in bristles which project into the nasal cavity” in Bobolinks, *Dolichonyx oryzivorus*, a pronounced migrant that apparently uses the Earth's changing magnetic field to guide itself^{b66}. Recently, homing pigeons were exposed to 2.5 hours of an oscillating magnetic field prior to their release. The pigeons had to fly a few kilometers before they shifted to the homeward direction. Their navigational abilities may have been slightly disrupted by the changing magnetic field^{t30}.

Flying

Before birds can fly above or below us, certain parameters of their wings and body weight developed. Fascinated by birds, Poole recorded the weight, wing areas, and weight to wing area ratios for 75 species. A wing was fully extended to obtain its area, and multiplied by two. For the American Crow he averaged the measurements of two birds –

Weight 553 grams
Wing area 1,344 cm²
Wing area per gram 2.4

Overall, the 75 species had an average wing area per gram of 1.9 (0.5 for the Long-tailed Duck to 5.1 for the Long-eared Owl) p79.

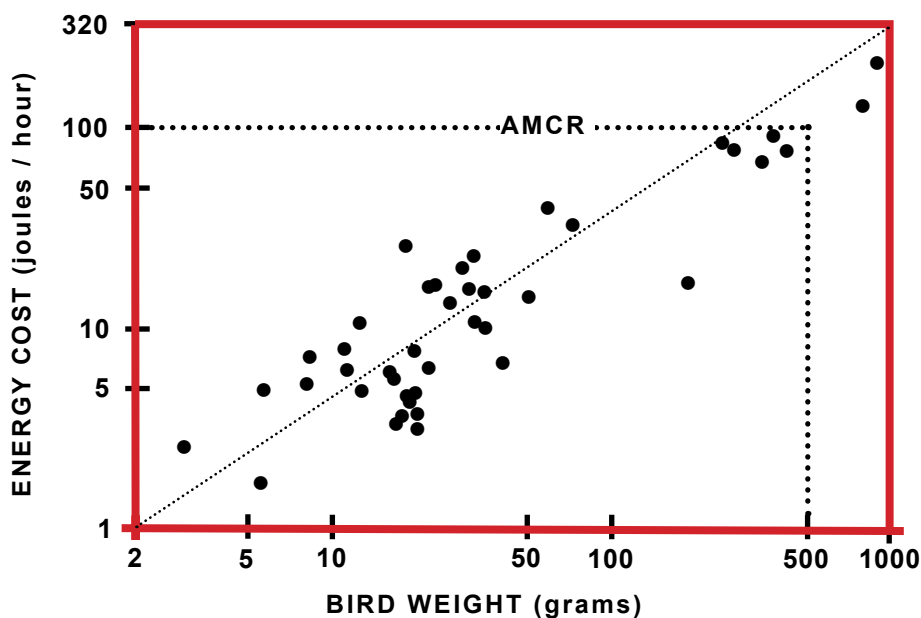


As ice floes melt along the Assiniboine River's bank, crows are already nest-building in **Winnipeg**

A Fish Crow was positioned in a wind tunnel. Its flight metabolism was 8 joules per gram per km at an air speed of 11 m per second or 40 km per hour. The energy cost to travel 1 km decreased with increasing air speed at all angles. To fly for 30 minutes, it didn't much matter if the Fish Crow flew slowly or quickly. This was based on b97 –

Weight 275 g
Wing area 917 cm²
Wing length 27 cm
Wing Span 56 cm
Aspect ratio (length to width of wing) 5.2
[wing area per gram 3.3]





298. A flying American Crow weighing about 500 grams would burn about 100 joules per hour (about 24 calories per hour at 15 °C). This is the metabolic cost of flight based on its weight. Data compiled and converted to a common unit of measurement c39, © Association of Field Ornithologists, with notification

Flight was viewed through a different window. The scaling of flight performance to body size in birds had been talked about, but not put to the test. The first tests involved avian burst take-off and vertical flight in the laboratory. To achieve this, birds used a combination and sequence of hindlimb, forelimb, body kinematics and total muscle power output. Corvids were the largest of the 32 species of birds tested. The Common Raven was the heaviest at 900 grams.

Generally, body size sets the limit on flight performance – maneuverability, acceleration and climbing rate. “Burst ability is a result of marginal power, defined as the power the muscles can produce in excess of the minimal power required for level flight.” All flights in the study were filmed at 250 frames per second. Linear flight was measured by –

- (1) a net change in velocity per wingbeat
- (2) acceleration per wingbeat
- (3) mass-specific climbing power that incorporated changes in both velocity and altitude

All three of the above measurements were negatively correlated with the weight of a bird. For the American Crow and Common Raven, peak velocity was attained at toe-off, and each bird lost

velocity with each successive wingbeat in vertical flight. The first downstroke was unique, and for most flights started before toe-off. The two flight muscles of the wing, pectoralis m. (downstroke) and supracoracoideus m. (upstroke) together averaged about 15% of the weight of the 5 corvids in this study i02.

Speed and distance

In late September, at the Pea Island Waterfowl Refuge on the Outer Banks of **North Carolina**, the average air speed for 3 American Crows was 46 kph (12.7 m/sec) t78. Radio-tagged, northward migrating crows in spring flew at an average speed of 44 (29–60) kph w18. Crows traveled with an average speed of 42 (27–56) km per hour 88b.

In a late season migration experiment conducted in **Alberta**, a good traveling day was 53 kilometers for a crow migrating from Alberta into North Dakota in early December. The fastest crow averaged over 80 km per day for three days 31r. Banding records indicated some prairie crows migrated the farthest – about 1,600 km twice a year. On either side of the **Great Plains**, the average distance was about 500 km 20b.





Spring arrivals

Those of us breathing clean northern air realize the American Crow is one of the earliest migrants returning from the south. As a true symbol of spring, it satisfies our inherent longing for an obvious sign of changing weather. Advancing crows appear in southern **Ontario** during mild days in late February. Throughout March, the push northward into nesting areas continues. If you are lucky enough to live near a large crow roost, you will notice the diminishing size of the flock due to the advent of spring.

The Chippawas in **Minnesota** named the crow an-deg, meaning “renewal” or “those that come” 16c.

The fly-and-social foraging theory was explored for American Crows that migrated northward during February and March 2004–2009. In east-central **Illinois**, crows over 500 grams were fitted with a 2-gram radio-transmitter (battery life of 3 months). These were mounted, using sutures and epoxy, on the rachis of one central tail feather. The migrating adult crows were followed and continuously tracked. Where they flew and roosted was noted. However, when birds landed to feed, the researchers lost contact with them.

Ten crows were tagged; 9 migrated north and one nested locally. Eight of the nine crows were followed, and two of these were lost before



reaching their breeding area. By following one or two crows each year, the initial findings were rewarding. Crows often migrated alone, but not always. All crows began migrating in the morning. One crow's signal was lost after 3 days when it crossed the western end of Lake Huron. For seven crows, the distance from roost to roost each day was 178–490 km. All crows roosted communally, and six crows roosted within 10 km of each other in different roosts in different years.



To investigate the migratory behavior of an American Crow, a transmitter was glued and sown to the rachis of one central tail feather. Photograph near Danville **Illinois**, © Arlo Raim, with permission





When the crows arrived at their breeding area, they roosted alone or with 1 or 2 other crows (family members?).

during migration the tagged crows landed to forage an average of twice a day, although some stops may have been missed. They foraged for 35 (5–82) minutes and in 17 of 18 observations were among 1–60+ crows. In **Michigan** some crows fed with ravens at a carcass. No crow migrated more than 500 km in one day, and most of them migrated



As I waited for a bus, a Manitoba Maple invited an American Robin to perch in late April near the Manitoba Museum in **Winnipeg**

the farthest on their first day – an average of 300 km. By the third day after leaving east-central Illinois, the average distance traveled was slightly less than 100 km. Average flight speed was 44 (30–60) kph.

Although the decision when to migrate

seemed to be an individual one, the social crows liked to feed and roost among other crows along the way. It was suggested that crows chose where to migrate, but I could also suggest if the adult crows were returning to a familiar nesting territory or area, their destination was fixed before they began to migrate, especially if territories were established the previous year before they migrated south.

As the tagged crows migrated, they changed direction in the afternoon to join local crows at a communal roost. For the 8 crows, 3 roosted in the same communal roost along the way in three different years, and 3 other crows slept in different roosts in two different years. Joining a large roost may be a way for migrating crows to gain information from local birds about a source of food. One tagged crow stayed at a roost for 3 nights and fed with the local crows before it continued its journey northward. Another crow fed with roost members in the morning for an hour, before resuming its migration. Two roosts along the south-eastern shore of Lake Michigan were used along the way by migrants. For decades these roosts may have been used as familiar places in which to rest and from which to feed. In summary, the crows migrated during the day to take advantage of feeding and socializing opportunities with other American Crows w18.

A look at the migration of Dark-eyed Juncos, *Junco hyemalis*, revealed a couple of assets 23w –

- (1) Right before migration in the spring, the bird's weight was at a maximum
- (2) The stimulus to migrate was not a sudden impulse. It was the result of internal physiological responses and change in day lengths over an extended period of time

Canada

One of my many jobs since graduating involved weekly visits to dairy farms in a small area of southwestern **Ontario**. As I delivered products to the farmers, I watched for migratory crows. No winter roosts were operating in my work area near Guelph in the 1980s. Common weather had little influence on the crows' daily movements north





American Hazelnut leaves expanding in the spring as crows go about expanding their families

or south. Their main traveling months, March and October, had unsettled weather patterns. Light rain and wind of 20–50 km per hour over either wing was acceptable. Although described as daytime (diurnal) migrants, there is at least one exception. A noisy flock was heard passing north over **Saskatchewan** at 23:15 hours on 1 April 1978. No explanation for this night-crossing was given ^{o14}. Were the crows giving us an April Fools' Day prank? In open country, crows may travel 10–50 m above the ground, rising to pass over trees and cities. Moving in a straggling, loose formation, the long axis of the flock points in the direction of travel.

For the most part my field notes on migrating crows listed many single birds, and a few pairs of crows passing overhead. Spring flocks were sporadic, but I did record 11 that averaged 24 (5–100) crows. Most overhead flocks were counted during the last week in February, but on 6 April, 1981, the last large courage of crows flew by in a northeastern direction over southern Ontario's farmland.

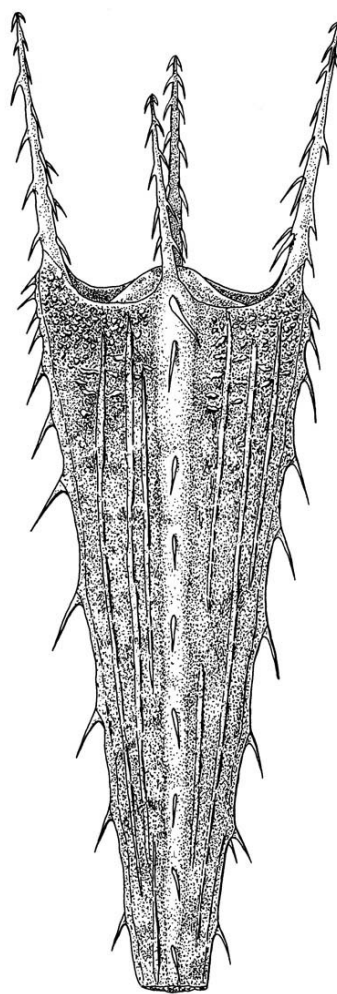
At Lyleton **Manitoba**, in the extreme southwestern corner of the province, a 4-hour passage of 5,500 crows occurred on 12 April 1975 over a 4-hour period during a cold spring ^{k78}.

Arrival dates of crows in the spring

Lat. 43° N, **Ontario**, ave. 2 Mar. 08s
 Lat. 44° N, **Ontario**, ave. 20 Feb. d40
 Lat. 45° N, **Quebec**, ave. 9 Mar. 5 years 62m
 Lat. 50° N, **Ontario**, ave. 21 Mar. 08s
 Lat. 51° N, **Saskatchewan**, ave. 22 Mar. 32h

United States

Great flocks impress crow-watchers. The migration in the **Toledo-Erie Marsh** area fell between 23 February and 11 April. Twice in early March, as many as 5,000 birds in one flock passed overhead ^{c29}. Along the south shore of Lake Erie, on 28 February 1931, a group of over 10,000 crows migrated ^{w95}. In Oswego County of **New York**, around the east end of Lake Ontario, an estimat



Bidens fruit also migrates





ed 37,000 crows flew by in six days during mid-March 1b3. They may have passed northward near Kingston **Ontario**.

By the end of April, for crows travelling north to northeast through **Illinois**, counts of migrating crows fell from 100–200 or more per day to about 20 or less a day. g55. At latitude 42° N in **Idaho**, 7 May was the latest spring migration d22.

Arrival dates of crows in the spring

Lat. 41° N, **Wyoming**, ave. 12 Mar. (earliest 28 Feb.) 8 years m77
 Lat. 41° N, **Pennsylvania**, ave. 18 Feb. (8 Feb.–4 Mar.), 29 years t56
 Lat. 43° N, **Oregon**, Malheur Wildlife Refuge, ave. 16 March (10 Feb.–3 Apr.) 16 years l51
 Lat. 45° N, **Minnesota**, ave. 14–23 Feb. r85
 Lat. 47° N, **N. Dakota**, ave. 22 Feb. 40m
 Lat. 49° N, **Montana**, ave. 16 Mar. (15 Feb.–10 April), 44 years w66

I slumbered this spring morning, and missed the dawn,
 From everywhere I heard the cry of birds.
 That night the sound of wind and rain had come,
 Who knows how many petals then had fallen?

– Meng Haoran r47

Autumnal departures

As the autumnal oranges, yellows and reds intensify before me, flocks of departing crows soar above me. Small, scattered temporary roosts in southern Ontario and on the prairies develop in August and September to accommodate the newly flocking crows'. After a few weeks the roosts disintegrate as the birds continue their journey southward.

Outside the window, wind and snow blow straight,
 I clutch the stove and open a flask of wine.
 Just like a fishing boat in the rain,
 Sail down, asleep on the autumn river.

– Du Mu r47

Canada

At Point Pelee **Ontario**, in the early years of the 1900s, groups of crows in mid-October were moving up and down the Point several times a day. Eventually, they may travel west and cross the Detroit River into **Michigan** where they will join one of the many roosts in Ohio, or those farther south 30w. Other large flocks of crows were reported at Point Pelee **Ontario** on the 14 and 15 of October 1906. They moved along the point and eventually settled in trees near the tip prior to departing southward as the jays had done earlier. When Blue Jays left the Point on 14 October 1906, they headed due south for the shore of Ohio, and not, as expected, towards Pelee Island to the west t10.

Funneled by the Great Lakes, autumnal flocks of crows fly in a southwest direction over southern **Ontario**. The flocks are more compact and slightly larger than those I saw in the spring. A wonderful sight was a flock of 250 crows directly over Guelph at 09:00 on the cloudy, calm morning of 18 October 1984. Two hundred meters above my feet, the crows traveled in an open company 300 m long by 60 m wide. Several regular bouts of caws reached me. An hour before sunset on 10 October 1987, eight crows, perhaps the last birds of a flock, traveled at 300 m altitude over Guelph.





During my autumnal visits to dairy farms in southern **Ontario**, migratory flocks were always anticipated, but usually failed to materialized. Reviewing my journal entries, the average size of 18 flocks was 62 (7–200) crows. One early sighting was on 26 September; the rest flew by in October.

The Holiday Beach Migration Observatory in the southwestern part of Essex County **Ontario**, is just east of where the mouth of the Detroit River enters the western end of Lake Erie. At the observatory, volunteers record the passage of hawks. In 1990 they began to record other birds. Over the 18 years, 1990–2007, the averaged was 144,000 crows per year within a range of 60,000 in 2007 to 269,000 in 1994. West Nile virus was detected in wild birds in Ontario for the first time in 2001 and in Essex County in 2003 when the migratory crows tallied 82,000 at the observatory. (Phil Roberts, unpublished report, 2000s). Obviously, not all the crows that bred or summered in Ontario stayed and roosted over the winter in the southern agricultural area of the province.

On 14 October 1945, a huge flock of crows, a kilometer wide, flew past the **Toronto** airport. The flock had 4,000 birds in sight at once and lasted most of the day s27. Near Carberry **Manitoba**, 5,000 crows migrated south on 13 October 1981 t18. Crows left the Qu'Appelle River area in southern **Saskatchewan** by 13 October on average, with the latest on 26 October 1934 c26.

On the west coast of Canada, in a beautiful **British Columbia** autumn, Theed Pearce mentioned some American Crows flew over the ocean for 10–30 km from the mainland to Vancouver Island where they joined Northwestern Crows. The two species were separated by their voices g75.

The understanding of bird migration remains with the birds. Nevertheless, to study migration, crows were captured locally in **Alberta**, then shipped to Edmonton for treatment and released on 26 November 1929. This was the first phase of an experiment. As it turned out, Edmonton was not the most suitable location, so the second batch of crows were released in 1931 at Hackett, about 100 miles (160 km) southeast of Edmonton. Five results 31r –

- (1) some normal crows subjected to increased daylength for 5 weeks in October and November, reversed their migratory direction and flew northward rather than southward
- (2) a control group of castrated crows subjected to normal photoperiods migrated southward
- (3) castrated crows that experienced an artificially longer daylength also flew southward
- (4) normal untreated crows flew south
- (5) a group of castrated crows received a male extract from human urine and did not migrate

The above findings indicated a link between



A harvest moon on 12 September 2011. During September and October crows migrate south during the day from the Canadian Prairies while warblers migrate at night, some colliding with man-made objects





migratory direction, daylength and a crow's reproductive organs. Temperature, as a regulatory influence, was at most secondary. The specific NW to SE direction of the migration corridor used by crows in **Alberta** was followed by almost all of the crows in spite of the time of the year (after the regular migration was over), wind, and unfamiliar terrain. Juvenile crows had a natural sense of direction ^{31r}.

United States

Generally, crows nesting in the central to eastern half of North America above 43° N latitude were migratory, while crows below it were mostly sedentary ^{20b}.

Banding at the Austin Ornithological Research Station on Cape Cod **Massachusetts** (lat. 42° N) identified 3 categories of American Crows ¹⁷⁶.

- (1) permanent residents
- (2) breeding birds that winter to the south
- (3) northern breeders that either winter at Cape Cod or migrate through the region

At the Narragansett Bay area of **Rhode Island**, American Crows in flocks of 30–90 crossed from 1–3.5 km of open water from island to island in the daytime, some with hesitancy as they circled before finally making the flight ^{b14}.

On 25 November 1888 from western **Pennsylvania**, the southern migration was usually over by the last of October, but a late flock passed through Beaver County ^{t56}. In eastern **Pennsylvania**, migratory birds in the autumn traveled along the Kittatinny Ridge. American Crows were common in late October. Estimates were 2,700 on 21 October 1968, to 500 on 24 October 1964. The latest was 870 on 30 October 1968 ^{h64}. On 20 November 1966, another late flock of 2,000 crows migrated over Erie County in **New York**. This flock probably entered the United States by crossing the Niagara River from **Ontario** ^{1b3}.

Ten thousand crows in 10 days in October migrated past Athens **Illinois**. Most crows entered Illinois from October through early November, which coincided with the formation of overwinter



Leaves of goldenrod in late November as ice forms on the Red River in Manitoba. By now crows have left the province

roosts ^{h12}. C Nixon reported several hundred crows at Monticello **Illinois** flying south in a long loose string with about 20 birds visible at one time ^{g55}.

There was little evidence that crows migrated over large open bodies of water until J Liefstinck was near Akron **Ohio** on 25 November 1937. Through binoculars he focused on “several thousand” crows not visible to the naked eye ^{w95}. Since Akron is about 60 km south of the middle of the southern Lake Erie shoreline, those high-flying crows probably migrated over the lake. If the wobbly Monarch Butterfly and numerous other birds can do it, why not crows? Additional evidence of crows migrating over a large expanse of open water included a flock of 105 birds on 6 October trying to leave the southern tip of Caribou Island in Lake Superior, about 70 km from the **Michigan** shoreline to the south ^{43w}. In Saginaw Bay, Michigan, the crow was a common breeder on Charity Island which was about 10–14 km from the shore. On 14 September, a flock of about 100 crows landed on the island for one day during their migration. A few very tame wild crows remained on the island all year ^{31w}.

A flock of 50 crows flew south on 7 October





east of the village of Lincoln **Michigan**. They followed the shore of Lake Huron. Six more crows passed on the 10 October. On 18 November 1912, a flock of over 1,000 crows passed from Essex County, Ontario into Wayne County by crossing the Detroit River into Michigan. The next day 20 more crows followed the same migration route 27w.

At Duluth **Minnesota** on 8 October 1995, a peak flight day, over a two-hour period 4,058 American Robins and 466 American Crows migrated south e09. A year earlier, on 26 October 1994, 554 crows passed through Duluth e09. Mrs W Boyd of St Paul **Minnesota**, stepped outside on 15 October 1927 when cawing at dawn caught her attention r85.

Thousands of them [crows] in a seemingly endless flock, moving to the southwest in a whirling, onward course, like leaves caught up in a whirlwind. Some as low as the house-tops and tree-tops, others so high as to be mere specks. Other people saw them and an item in the paper estimated the flock to be two miles long. It didn't seem possible there could be so many Crows.

Rosenwinkel reported a similar huge flight over St Paul **Minnesota** on the mornings of 11 and 12 October 1930. On 5 October 1907, an early evening flight was observed near Heron Lake in southwestern Minnesota. The crows were quiet in passage, but as they settled in trees much calling was heard. Then they rose silently and flew towards the sunset over a 2-mile stretch of water r85.

Autumnal departing dates of American Crows

Lat. 40° N, **Pennsylvania**, 20 Aug. – 21 Nov. h64
 Lat. 41° N, **Wyoming**, 18 October (latest 26 October 1930) 10-year ave. of last fall records m77
 Lat. 44° N, **South Dakota**, ave. 19 October l24
 Lat. 45° N, **Minnesota**, ave. 30 Oct.–5 Nov. r85
 Lat. 47° N, **N. Dakota**, ave. 23 Nov. (latest departure)

Other passerines (nocturnal)

In southern **Sweden**, the wind patterns were studied in relation to autumnal nocturnal departures by four passerines. Although sample sizes were small, the radio-tagged birds generally departed south with a tail wind, or in a light wind. Some birds departed into a headwind, but this was forced upon them by a narrowing window of departure time. Cloud cover had a mean of 3.4 (0 = clear; 8 = total cloud cover) at departure. The mean departure time was 68 minutes after sunset within a range of 7 minutes before sunset to 4 hours after sunset. One bird began its migration about 7 hours after sunset. Thrushes followed a 212° track direction a05.



License plate of a crow bander

Banding

In 1804, at the age of 19, John J Audubon was the first to band birds in the **New World**. By placing silver threads around the legs of nestling phoebes, he showed they came back to the same area the next spring t25.

Banding (ringing) is a way of uncovering central concerns about wild birds. It permits us to chart their movements by the hour, day, season, or year. We may discover how long birds live, where they travel, and how they die. These concerns are of interest for an individual bird and the population in which it functions.

The early abbreviation for the Common Crow was COCR. When it became known as the American Crow, its abbreviation changed to AMCR. Its AOU number is 488. These letters and numbers are used on banding forms. k76.

Two methods are useful for marking crows.





Crows and floes migrate together in the spring, each using a predetermined pathway in a different medium

The standard aluminium leg band, number 5 size, is the choice for long term projects. Colored leg bands, alone or in combination, are used for local studies ^{29w}. Where sight recognition of a local bird is necessary, the patagial wing tag (3.5 x 6.5 cm), bearing two large letters or numbers, is useful. One weighing 7 g was developed for the Common Raven. Ravens carried the tags as long as six years and displayed “typical” flight and behavior ^{54s}. However, a closer look at the effects of tags may be necessary. When Ring-billed Gulls were wing-tagged, females were less successful in acquiring mates in the year after tagging than were male gulls ^{20s}. For Ruddy Ducks, *Oxyura jamaicensis*, in **Manitoba**, tagged males decreased their courtship rate, and increased their sleeping and preening times. Tagged females preened more than untagged females ^{0b3}. I am not aware of a study on the effects of patagial tags on the behavior of crows.

before a crow is marked, it must be caught alive. Numerous ways have been tried, and some actually work. The Australian crow trap is a good start. Cannon netting, a dramatic experience for bird and bander, can be successful, but use a 2.5 cm (1 inch) size mesh to eliminate excessive tangling by the struggling crows. Cannon netting at a large roost ensured the birds never again settled onto the ground where they were netted.

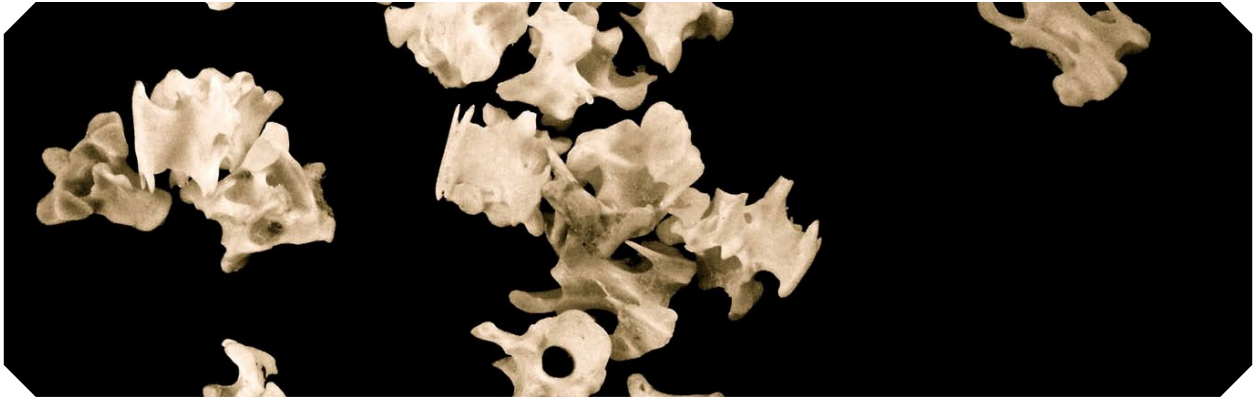
When a field away from the roost was baited with bread and poultry pellets, 14 canon nettings allowed a band to be placed on 2,000 crows. In **Oklahoma**, another successful method in wet weather was grabbing birds by hand as two million crows slept in a roost in a woodlot. In dry weather, the noise from walking awoke and frightened the perched crows, and reduced the number captured. An attempt to capture crows using bait coated with drugs showed little promise in Oklahoma ⁱ⁰¹.

Black-billed Magpies were trapped 30 km south of Pocatello **Idaho** from October 1995 to May 1997. Three different types of traps had different levels of success at various times during the breeding season. At best, a 50% rate of capture can be expected. Decoys were used ^{w13}.

In eastern **Massachusetts**, 151 live American Crows were captured at two study sites from 1998 to 2008. The crows were captured in commercial box traps, 152 (or 183) x 51 x 66 cm, made to capture Eastern Coyotes, *Canis latrans*. Traps were baited with meat scraps and armed (set to close) once animals were accustomed to taking food from inside the traps. Traps were armed for 3,713 days year round, and visited 14,193 times. American Crows were one of 931 animals of 21 species caught. More than one crow was sometimes captured – 19 pairs, 4 trios, and one group of 6 crows. The seasonal totals were – spring 70, summer 22, fall 26, and winter 33 crows. The monthly average was 13 crows (2 in August to 45 in May). The overall average was 4 crows captured per 100 trap days. Two crows sustained wing injuries when inside the \$400 trap. The trap was easily transported and placed in a field. The best success was from traps placed in open fields, where crows could see for greater distances around the traps ^{w35}.

Trapping live American Crows in **Illinois** was difficult until a suitable trap and bait were devised. Eventually a crow was caught. The trap was a wooden, 8 x 4 foot, covered frame with netting on top. The trap was placed vertically on one end and pulled over using a wire by observers in a nearby blind. The trap was not disguised, but it was baited with a carcass and some eggs. Another carcass was placed near the trap. When





American Crow – falling vertebrae

a crow was trapped it was quickly removed and placed in a large visible cage behind the trap. Keeping several crows in this cage helped to attract other crows. Although the other crows got excited when one of them was caught, they remained nearby and continued to be caught. One was caught twice in one day, then again 2 days later. The author suggested the crows did not learn much from their association with man, trap and bait, and appeared no more intelligent than other birds in this regard. However, I suggest that by placing live crows in a cage near the trap, the free crows realized they were not being killed when caught, so they stayed and continued to feed on bait inside the trap t01.

Carolee Caffrey tried several ways to catch crows in **California** and **Oklahoma**. Nothing worked really well. Some mistakes in preparation were to blame; other methods left the crows in charge. She tried carpet nooses, sticky rat traps, leg hold traps, a modified Australian Crow Trap, cannon and rocket nets. Two important considerations in the game were using bait that crows had to eat at the site and not cache elsewhere, as well as trap location c15.

Once crows were caught, Caffrey suggested ways to band them. A size 5 USFWS metal band has a 7 mm inside diameter. Mauve, black, and dark green plastic bands cannot be seen from a distance. If plastic leg bands were not securely glued, crows removed them. Patagial wing tags were somewhat successful. The numbers and letters drawn on the tags sometimes faded too soon, depending on the chemicals used c16.

Band recoveries

Any banding program is limited by the rate and percentage of band returns. Since birds are generally short-lived, a 10–20% return rate over 4–5 years after banding provides adequate information. Species that are widely hunted, such as waterfowl and crows, provide many quick recoveries of bands, but biases are due in part to the cultural habits of the hunting fraternity. The right birds must meet the right people if bands are to be returned and information obtained to justify the banding effort. Martin Moose highlighted this recovery problem 50m –

THE DEAD CROW

There is a dead crow out on the sidewalk: it is on my side of the walk so now it is my responsibility and something must be done. I wish it were on the other side, then I could just ignore it. But it's not, it's on my side and so the dead crow has entered into my thoughts and wherever I go, in the house or in the yard, it is already there. It's not the most pleasant thing to have in your thoughts, a dead crow. I eye it from time to time and notice that all the other crows keep flying over it and squawking: they can't seem to believe their eyes. I can understand that – neither can I. What I can't understand is the behaviour of the neighbourhood kids: they are riding their bicycles up and down the street and paying no attention. They are even playing ball right beside the crow and yet never seem to notice: not once do they glance down in silent awe. I can't





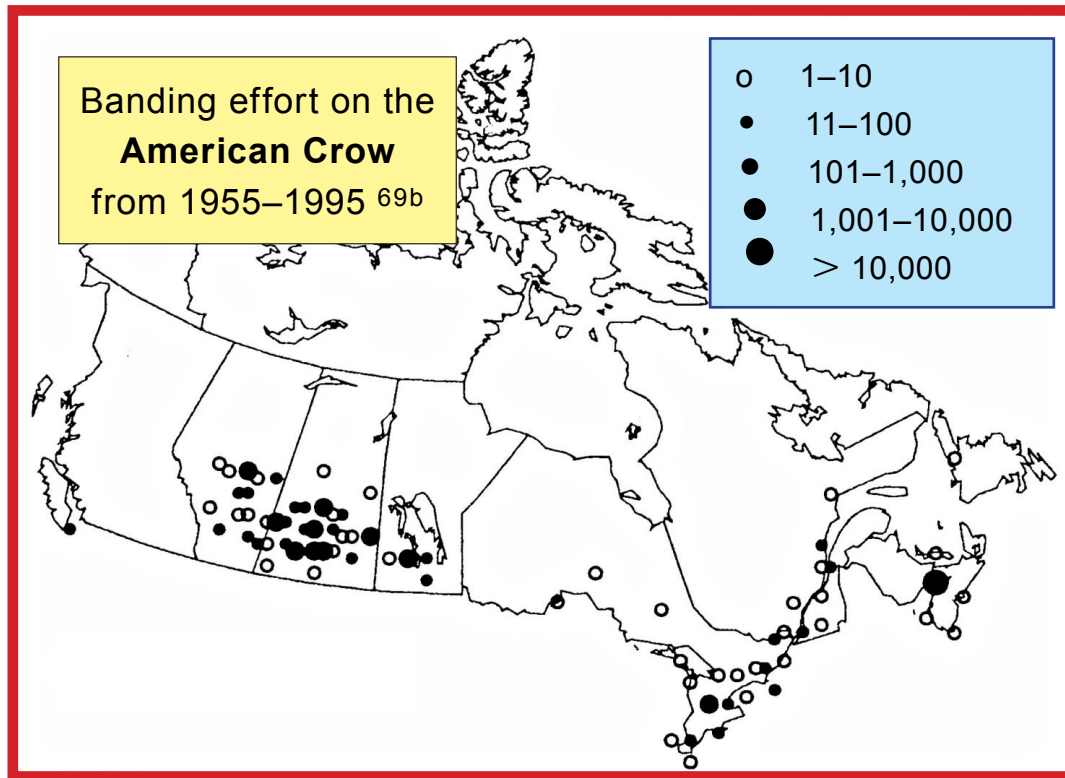
308. By decade, the 1930s held the most recoveries (47%) of banded American Crows in Canada and the United States together – from a 1984 Canadian Wildlife Service (CWS) printout

Decade	Band Recoveries			
	Canada %		United States %	
1910s	0		1	
1920s	56	8%	78	7%
1930s	398	60%	404	39%
1940s	70	10%	188	18%
1950s	32	5%	165	16%
1960s	53	8%	134	13%
1970s	55	8%	54	5%
1980–'84	4	1%	19	2%
Totals	668		1043	

308a. SK and AB had the highest total recoveries (69% combined) of American Crows in nine Canadian province. On average, 75% of the bands were recovered within the province where the crows were banded. Data based on a 1984 CWS printout

Banding Province	Band Recoveries						
	Total		In the province		Outside the province		
					Can.	U.S.	
Saskatchewan	307	46%	229	75%	6	72	25%
Alberta	150	23%	82	55%	22	46	45%
Nova Scotia	62	9%	57	92%	4	1	8%
Manitoba	48	7%	34	71%	0	14	29%
Ontario	41	6%	30	73%	1	10	27%
Quebec	29	4%	20	69%	1	8	31%
British Columbia	23	3%	22	96%	0	1	4%
Prince Edward Island	5	1%	2	40%	1	2	60%
New Brunswick	3	1%	3	100%	0	0	0%
Northwest Territories	0		0				
Totals (ave.)	668	100%	479	(75%)	35	154	(25%)





309. Locations in Canada where the majority of American Crows were banded in 40 years 69b

believe that they aren't paying attention; I can't understand why there is not a hush over the street, a dread sense of expectancy in the air, with every hidden eye glancing nervously towards the dead crow on my side of the sidewalk. I wish it were on the other side, but it's not: it's on my side and something must be done.

From the Canadian Wildlife Service I obtained printouts in 1984 listing the recoveries of banded American Crows in Canada and the United States. The 1930s was the decade of serious banding activity with this species. In particular, crows were banded in **Oklahoma** in the winter of 1935–1936. Two men set several Australian type traps near a roost. When the traps were baited with carrion, the daily catch was up to 177 crows. The birds appeared faithful to one roost over a winter and they often moved along the same flyways to and from the roost. Recaptures were inevitable. The extremes were 75 crows caught twice and 2 crows caught seven times. By spring, 714 birds sported a new leg band. Over the next 3.5 years, 143 (20%) bands were recovered. The rate of return

was by then very slow. The diminishing returns silently told the two men that 4 years was close to the life expectancy for a migratory crow in the



Dead crow on sidewalk





central plains. The most northern return was a crow shot at Meadow Lake **Saskatchewan**, some 2,380 km from its banding site in Oklahoma.

Additional results from this banding adventure were enlightening for the 1930s. During the breeding season, April–August, none of the 143 band returns came from **Oklahoma**. From 65 recoveries over these five warm months, 75% were from the three prairie provinces, with **Saskatchewan** leading the way ^{k13}. From 2,568 crows banded over the winters of 1966–'70 in

Oklahoma, most of the 81 bands recovered also came from the prairie provinces – Saskatchewan 42%, Manitoba 20% and Alberta 16%. Together, six states returned 22% of the bands ⁱ⁰¹.

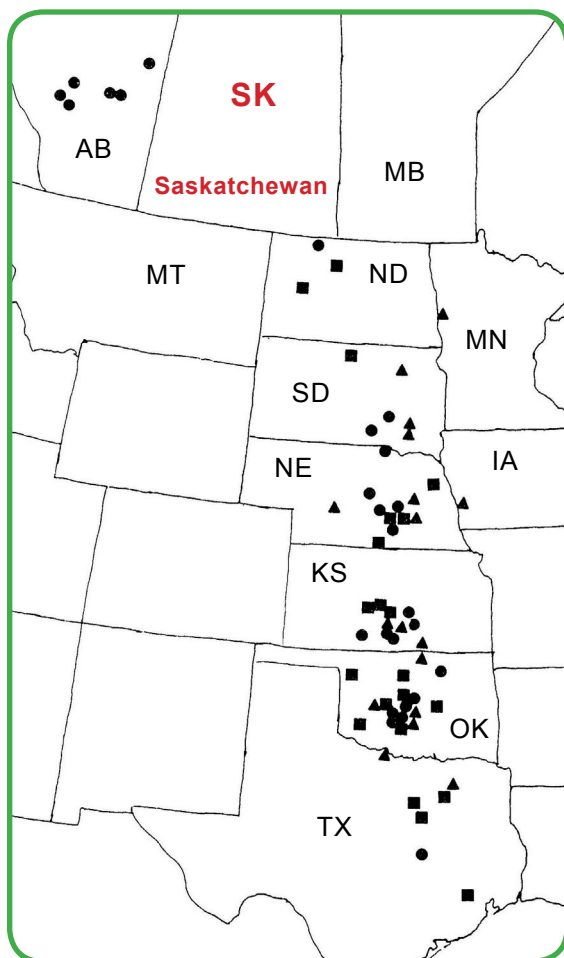
As a result of the above work, the question facing wildlife (crow) managers and politicians in the 1940s, was – What were the benefits from dynamiting a winter roost in the southern states? Nothing important was mentioned. Where most of the crows nested in **Canada** and wintered in **Oklahoma**, a corn culture was replaced by wheat

310. Oklahoma was the top state (16% of 1,043) for American recoveries of banded crows from the 1920s to the early 1980s. From a CWS printout on 25 October 1984

State	Band Recoveries						
	Total		In the state		Outside the state		
					U.S.	CAN.	
Oklahoma	162	16%	49	30%	53	60	70%
Illinois	143	14%	129	90%	13	1	10%
Pennsylvania	132	13%	111	84%	11	10	16%
Ohio	98	9%	96	98%	2	0	2%
Massachusetts	58	6%	52	90%	4	2	10%
New York	56	5%	51	91%	5	0	9%
Michigan	40	4%	34	85%	6	0	15%
Wisconsin	39	4%	36	92%	3	0	8%
North Dakota	31	3%	14	45%	11	6	55%
Iowa	31	3%	19	61%	11	1	39%
Kansas	28	3%	18	64%	6	4	36%
Maryland	23	2%	23	100%	0	0	0%
Colorado	22	2%	15	68%	1	6	32%
Connecticut	21	2%	18	86%	3	0	14%
Indiana	21	2%	19	90%	2	0	10%
California	18	2%	18	100%	0	0	0%
New Jersey	18	2%	17	94%	1	0	6%
Minnesota	14	1%	12	86%	2	0	14%
Tennessee	10	1%	10	100%	0	0	0%
Totals	965	93%*	741	82%	134	90	18%

* 20 states, each with less than 10 recoveries, account for the additional 78 band returns or 7.5% of the 1,043 total returns





311. American Crows were banded in **Saskatchewan** from the 1920s–1960s. The locations of recovered bands in the Great Plains beyond Saskatchewan 34h, © Blue Jay

and other small grains. Crows do not damage these crops to any great extent. Instead, grasshoppers and mice are periodically very abundant on the prairies, and crows are valued for reducing their impact on grain crops. True, some crows destroyed ducks' nests, but the amount of damage was slight, variable and exaggerated by special interest groups. In **Oklahoma**, the control of crows was, "not considered a pressing problem" k13.

Viewing the situation from higher latitudes, crows banded in southern **Saskatchewan** from 1923–1965 had their recoveries mapped. The narrow migratory path of the province's crows was restricted in the main from 95–100° W longitude in the United States (**Map 311**). Excluding the re-

coveries from within Saskatchewan, and six from Alberta during the warm months, the remainder and majority of the band recoveries reached into the central states of the **Great Plains** 34h –

- | | |
|-----------------|--------------------|
| (1) Oklahoma 17 | (4) Texas 7 |
| (2) Nebraska 12 | (5) South Dakota 6 |
| (3) Kansas 12 | (6) North Dakota 3 |

Shooting (hunting) accounted for most of the band returns, and 90% of the 58 American returns were between October and March. The most southern recovery was a crow banded near Swift Current **Saskatchewan** and shot near Houston **Texas** in the same year. The crow travelled at least 2,500 km. Crows banded in **Canada**, and bands recovered in the USA were analyzed for the years 1921–1995. Among the additional long-distance records were four returns over 2,500 km 69b –

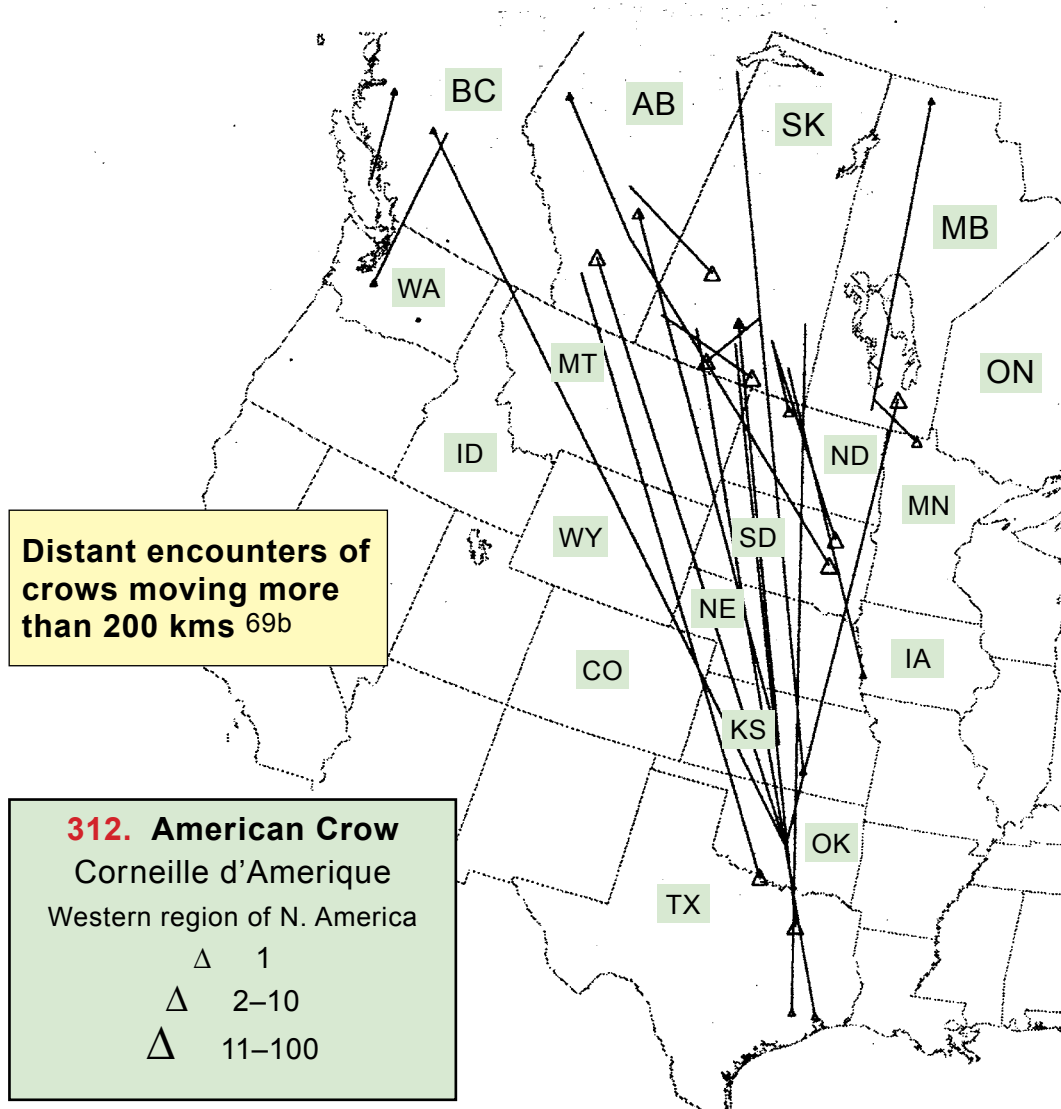
- (1) Fort Chipewyan **Alberta**, (HY), banded 2 July 1940, recovered 9 months later 2,505 km away in Wichita, Kansas
- (2) Beaverhill Lake **Alberta**, (U), banded 25 August 1933, recovered 7 months later 2,593 km away in Merit, Texas
- (3) Bashaw **Alberta**, (J), banded 18 June 1939, recovered 7 months later 2,677 km away at Hewitt, Texas
- (4) Norman **Oklahoma**, (AHY), banded 5 February 1936, recovered 4 years 2 months later 2,804 km away near Williams Lake, British Columbia

Sometimes a short-distance band recovery is published. For example, on 27 May 1953, a crow nestling was obtained from the eastern edge of Medina **Ohio**. It was kept for 10 days, banded and released. Less than a year later, it was shot dead on 8 March 1954, near Rittman Ohio, about 13 miles (21 km) south of its nest site d43.

Crows were banded in central **Illinois** during February and early March. Recoveries were quickly reported by 19–31 March from Michigan and Ontario 20b. The banding activity in Illinois is illustrated in the article with a map g55.

The banding world entered the computer age in 1955. From 1955–1995, 4,867 crows were banded in **Canada**. **Tables 308a and 310** reveal



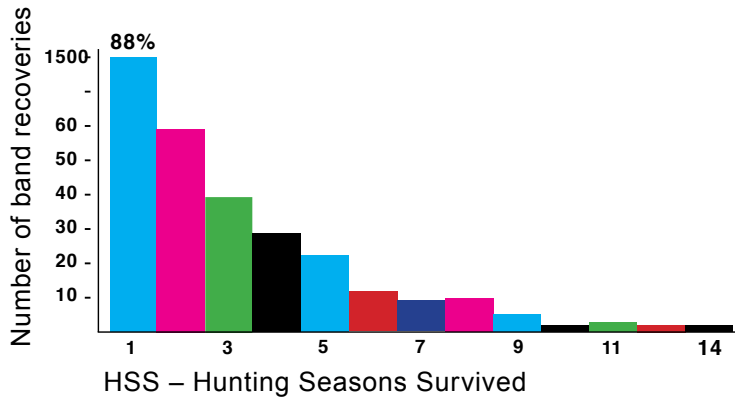


most band recoveries came from the province or state where the crows were banded. Such recoveries in Canada amounted to 75% compared to 82% in the United States. **Oklahoma** was the exception. Only 30% of its recoveries were from within the state, probably the result of a very large migratory crow population that roosted there only in the winter. Recoveries of bands outside the state of banding in the United States averaged 18% (14% in the USA and 9% from Canada). From crows banded in Canada, recoveries from outside the province of banding averaged 25% (23% in the USA and 5% in Canada). This difference in values between the countries could simply be due to a greater amount of hunting pressure on crows in the United States. However, a look at

the overall hunting pressure and the peak months for band returns from hunting does not support this idea.

In **Canada** the top banding months were May (14%) and June (43%). In the United States the peak banding activity took place in May (38%) and June (13%). These figures match the times when nestlings fledge into juveniles in both countries. Coincidentally, band recoveries were at their zenith in June (14%) and July (15%) Canadian time, and May (13%) and June (12%) American time. Bisecting a year into warm and cool months, 77% of Canadian banding activity took place in warm months (March–August) as did 69% of the American activity. Recoveries during these warm months amounted to 57% in Canada and 56% in





313. The oldest wild American Crow was at least 14 years based on 1,711 band recoveries from hunters in Canada and the United States – Canadian Wildlife Service print-out, 1984

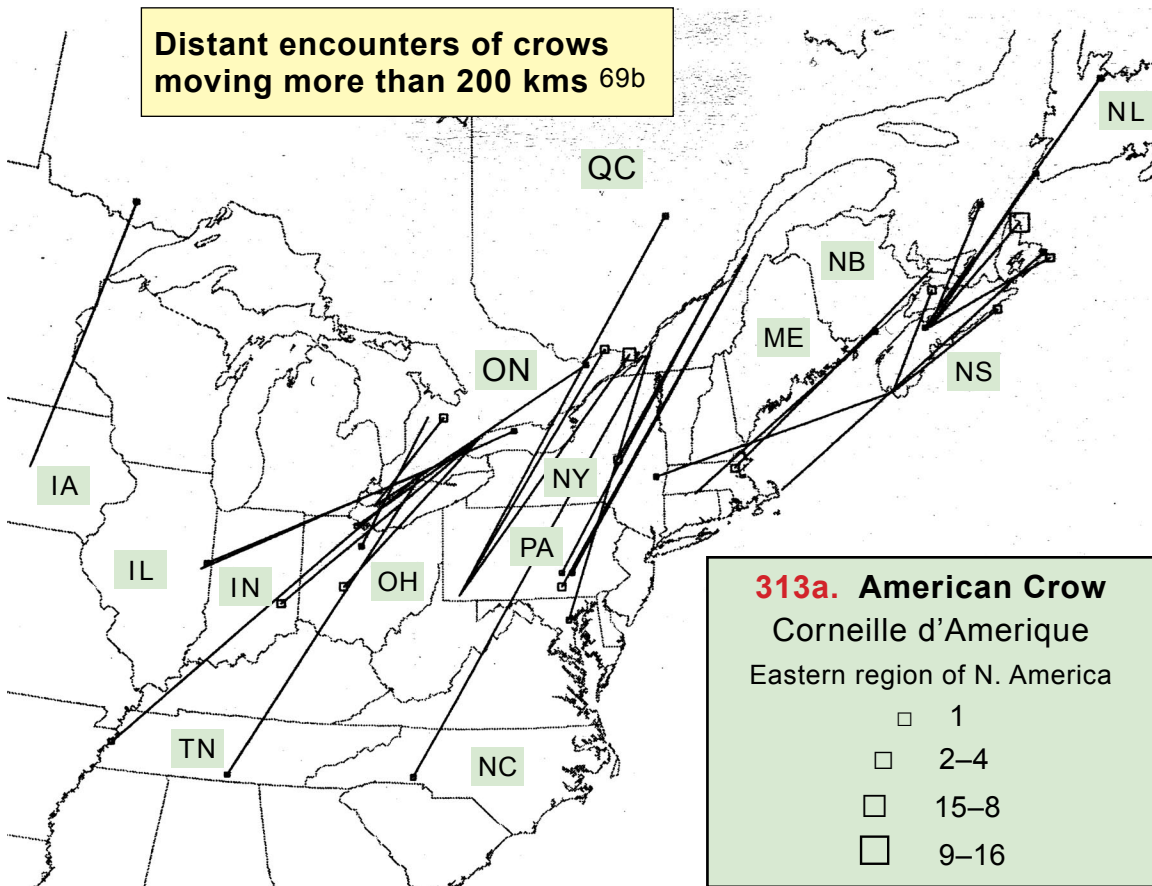
the United States.

The majority of band returns came from the hunting public. In Canada 74% of bands were returned by hunters. In the United States the

recovery was 58%. Crows were shot in every month. Only now are hunting seasons for this valuable and useful migratory songbird being established by the more enlightened people.

Canadian band returns from hunting peaked in June (13%) and July (15%), when juveniles were the most vulnerable and easily shot. March, our slowest month, contributed only 5%. The United States had March with 11% of its shooting returns. Its weakest month was August at 4%. This look at the two country's shooting habits is a study in contrasts that is explained in part by cultural differences and the habits of the crows and hunters.

Momentarily stepping away from the 12-gauge blast, here are a few obscure ways banded crows died – hit by a train, drowned, and entangled in





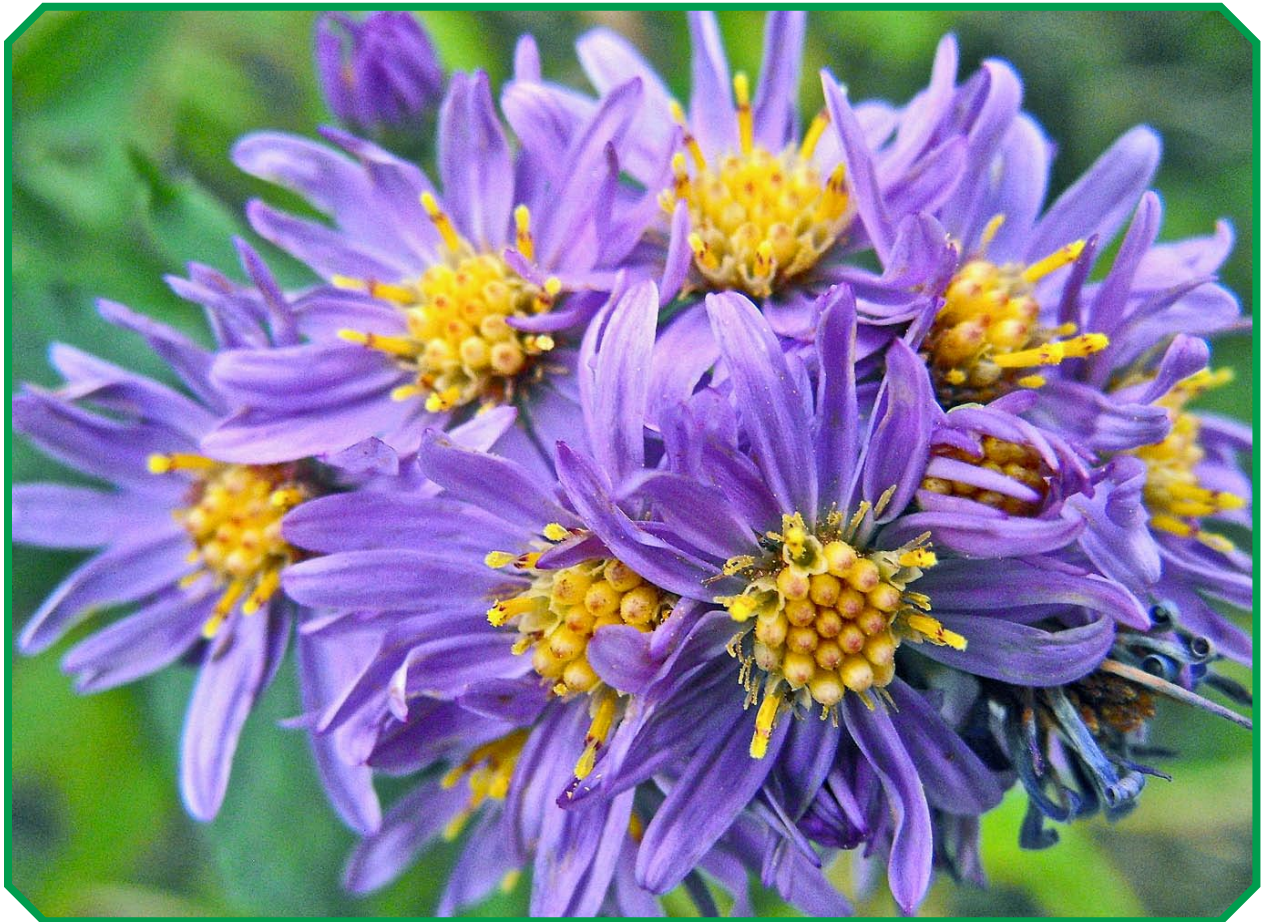
fishing gear. Diseases and injuries that killed crows accounted for only a tiny portion of band returns.

The relationship between hunters and band returns can result in a rather large bias. When and where crows are banded alters the picture considerably, as does the timing of hunting pressure. History provided a lesson about the behavioral patterns of hunters. During three summers, 1936–1938, Fred Bard banded adult crows in Saskatchewan. To ensure recoveries of the bands, he advertised his project and gave prizes for shooting banded birds in the province. Regrettably, hunters become so adept at picking out his banded birds, Bard was forced to paint the shiny aluminum bands black to extend the life of the crows in order to obtain recoveries from migrating birds outside the province ^{34h}.

The rapport between crows and hunting man has undergone modification. Throughout

the 1930s, North America experienced both an agrarian and economic depression. The “dust bowl” years on the prairies and Great Plains dried the fields of wheat and the potholes required by nesting waterfowl. Farming and duck production declined. A map of the band returns pictured crows hobnobbing with ducks nesting among the grain fields. Duck hunters were taught to frown on this association. Frustrated by the lack of ducks to shoot, they were easily convinced by gun and ammunition companies that crows, and not the weather and disappearing potholes, were to blame for the lack of ducks to hunt. In response, hunters shot millions of crows. Thousands more were blown apart with dynamite at wintery roosts by the reckless attitude of Departments of Conservation in the United States.

Eventually attitudes changed. The returning rains restored the prairies. Duck numbers and our economy improved. Crows lost their “hot item”



Smooth Aster blooming in mid-September as crows are starting to migrate south from **Manitoba**





status. World War II cast its dark shadow over the early 1940s. Our social system had more severe issues imprinted on it. On the flatlands, crows were as helpful and impious as ever, but we began looking in a different direction, and with a wider vision – the war was over.

Hunting seasons survived

One column on banding printouts was labeled HSS, or **Hunting Seasons Survived**. HSS indicated how long a crow lived from the time it was banded until the time when its band was returned or reported. If a crow was banded as a nestling or juvenile, its age at the time of recovery could be calculated. If banded as an adult, its age was equal to the number of HSS, plus an unknown number of years of living before it was banded. Keeping in mind the inadequacies of hunters as a reliable means of reporting banded crows, I have nevertheless produced **Graph 313**, based on the number of HSS. The ski-slope design of this graph shows how people and destiny sculptured the existence of wild American Crows in North America.

Most Carrion Crows in **Britain** died by the gun. Of those not hunted to death, juvenile crows, fresh from the nest and inexperienced, had their frail lives swallowed by the many disguises of death. June and July were the months of highest mortality for juveniles. Further along, yearlings and adults died most often in the spring, in the early part of the breeding season. Reproductive and territorial stress were cited as the reasons. Loosely speaking, sex was killing them. Spring and summer had the highest reported deaths in the three age-classes. It was difficult to directly implicate a shortage of food as the culprit at this time of the year ^{23h}.

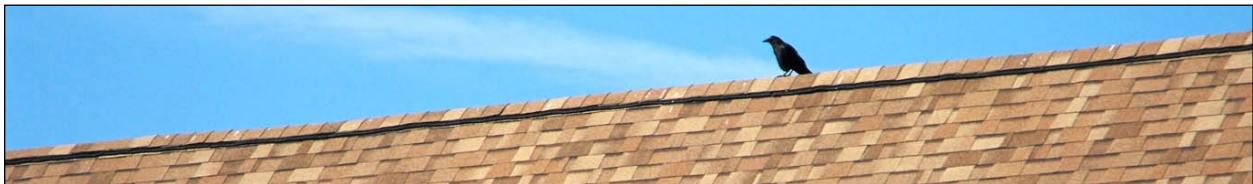
Before I end this section, it might be of interest to know the earliest banding of an American Crow that was recovered was 22 June 1917 in **New Jersey**. Banded along the coast, the crow was found dead eight hunting seasons later in the same location on 21 October 1924. In **Canada** the earliest recovery was from a crow banded 26 August 1922 in **Quebec** near the New York border. It was shot a month later in Quebec.

Longevity

Birds in captivity should live longer than their wild compatriots. Alfred Gross knew of captive crows that exceeded 20 years of age ^{b88}. This was not surprising since caged birds, with an attentive keeper, enjoyed a regular supply of food and water, and had their natural enemies cancelled.

From 15,752 banded crows, only 1,680 (11%) of the bands were recovered ^{c68}. From this select company, a wild banded crow was 14 years, 7 months of age when shot. It was banded in **Otto Manitoba** on 16 April 1924 as an adult of unknown sex (U). Its band showed it was shot in **Sherman South Dakota** on 13 January 1938. Recently, a new age record of 28 years for a wild American Crow was published by FA Dilling (1988) in The Ontario Bird Banding Association Newsletter **33**(2): 2–3. However, there were no details on the date of encounter so it was not accepted as a longevity record ^{69b}.

A banded Northwestern Crow was watched at a feeder for 3 winters. When last seen it was more than 16 years, 9 months old ^{z15}. I would guess it was a resident along the west coast, with no long-distance migration necessary. A nestling Blue Jay, captured and held captive in Pitman **New Jersey**, lived for 26 years and 3 months ^{c97}. ■



American Crow on the roof of a church

